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Perception of Extension Officials on Technology Adoption by Rural Farmers in Omusati Region of Namibia

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ABSTRACT

Agricultural production in northern Namibia is affected by erratic rainfall, low soil fertility, limited access to credit, pest and disease incidences as well as limited use of new agricultural innovations. Despite efforts by the government to increase farmers' productivity, adoption rate of modern innovations is however, still very low among rural farmers. The purpose of this study is to find out the perceptions of the agricultural extension officials on the technology adoption by the farmers in Omusati region. The research questions focused on soliciting information on perceptions of extension officials on agricultural innovations among rural farmers. A purposive sampling method was used to collect data from agricultural extension officials using a structured questionnaire. The data was analysed using frequencies and cross tabulations for descriptive statistics. The results indicate that most public extension officials feel that they are not specialised in all areas that they need to assist farmers in, area of jurisdiction is too large, and the allowable kilometres for visiting farmers are too low. Furthermore, the results showed that farmers do not attend meetings, farmers fail to follow instructions, farmers lack interest in new technology, extension officials are not adequately trained on new innovations and have too much administrative work among others. The study concluded that the extension officials perceive technology adoption among rural farmers to be moderate (average) due to both extension officials and farmers' related factors such as farmers not following instructions and farmers not attending meetings where information on technology is shared. The study thus recommends that there is need for training of extension officials on new technology use, hiring more extension officials, hiring office assistants to assist with office administrative work and create awareness among farmers on aspects that can enhance technology adoption by farmers.

1. Introduction

It is estimated that about 65% of Namibia's population, dependent on the agricultural sector as their main source of food and income (Namibia Statistics Agency, 2012). Agriculture contributes about 3.2% to GDP and 10.7% of export earnings for the country (Namibia Statistics Agency, 2015). Agricultural production especially in North Central Namibia is affected by erratic rainfall, low soil fertility, limited access to credit, high incidence of pests and diseases, lack of technological development and out-migration of labour ((Food and Agriculture Organisation of the United Nations, 2016) as well as low uptake of new agricultural innovations (Vigne & Whiteside, 1997). In Namibia, and in particular in Omusati Region, subsistence farming supports about 75% of the population engaged in crop and livestock farming. Since a large proportion of the population lives in rural areas, drought usually has devastating effects on agricultural productivity and the rural poor (Christelis & Struckmeier, 2001) causing reduced grain production (Government of the Republic of Namibia, 2002).

Low production of the Namibian communal agricultural sector has made it difficult to attain food

security at household level. One of the reasons for the existing structural food insecurity at the household level in rural areas is lack of improved farming practices and crop varieties, which acts as a principal barrier to production (Food and Agriculture Organisation of the United Nations, 2016). The need for agricultural extension services is seen as in the interest of the nation as stipulated in the Namibia Agricultural Policy that through extension efforts, increased food production could ensure food self-sufficient and food security at the national and household levels. In order to realise food security at household level, the Government, through the Ministry of Agriculture, Water and Forestry has implemented a number of policy interventions and programmes in order to enhance the output of farmers. In order to ameliorate these challenges, the government of Namibia introduced Extension Advisory Services (EAS) to advise farmers and in order to implement the EAS, Farming System Research and Extension (FSRE) approach was adopted in 1997 by the Ministry of Agriculture, Water and Forestry after independence in order to come up with appropriate technologies.

Innovations usually bring with them some degree of benefit to potential adopters but it equally creates some kind of uncertainties in the mind of adopters (Rogers, 1995). Other authors, (Wossink & Boonsaeng, 2003) have observed that perception and knowledge of both farmers and extension agents is crucial for successful research and development strategies. Sustainability of agricultural production is largely dependent on the action of farmers and their decision making abilities given the level of knowledge and information that is available to them (Rahman, 2003). However, the role of perception has received very limited attention in studies regarding farmers' adoption of a new technology (Wossink, de Buck, van Niejenhuis, & Haverkamp, 1997; Adesina & Zinnah, 1993). Also, there has been a general failure of programmes to address situations where farmers' knowledge is lacking and inadequate (Nyeko, Edwards-Jones, Day, & Raussen, 2002). Thus, sustainable adoption of new innovations, a good understanding of the needs and perception of the extension agents is required in order to devise a systems approach of introducing the innovation to farmers.

In recent years, there has been increasing focus by the Namibian Government on improving agricultural sector through the investments in new innovations development and technology transfer. Theoretically, introducing new technologies can obviously increase agricultural productivity and production. However, despite these government efforts to improve agricultural development, farmers' production has not improved much and uptake of new technologies is still low. Moreover, farmers often complain of not receiving adequate extension advisory services. Likewise, extension officials also complain of being inadequately resourced to carry out their duties successfully (Chi & Yamada, 2002).

Most of the farmers in rural areas are characterized by poor farming practices, low adoption of improved farming methods and low productivity. In order to be successful in agricultural production, farmers have to adopt improved farming practices and technologies. It is thus important to understand factors which are likely to affect technology adoption so that those concerned with designing efficient mechanisms of technology transfer can make sound decisions (Kavoi, Mwangi, & Kamau, 2014). Keeping in view of the afore-mentioned the current study is an attempt to determine the perception of agricultural extension officials on technology adoption among farmers.

2. Materials and Methods

The study used a mixed approach whereby both qualitative and quantitative methods were used to solicit the information. The study used a purposive sampling method in which extension officials in Omusati region were engaged through face to face interviews using a structured questionnaire. The intention was to interview all the extension officials in Omusati region, however, the researchers managed to interview only twelve (12) of the fifteen (15) officials that are stationed in the region which represents 80% of the targeted population, due to unavailability of some extension officials. Different levels of the extension officials that include the Acting Deputy Director, the Chief Agricultural Scientific Officer, Agricultural Scientific Officers, Chief Agricultural Extension Technicians and Agricultural Extension Technicians were interviewed in order to obtain information from the different levels of extension officials. The officials were visited at their duty stations after appointments were made. A structured questionnaire was used to interview the extension officers. The questionnaire asked among other questions educational qualifications, length of employment period in the current job, relevance of education qualification received, areas of specialisation, extension method used, area of coverage, technology given to the farmers, satisfaction with adoption rate, among others. The

data on perception was ranked using a 5 point Likert Scale. The data was analysed using descriptive statistics including frequencies, means as well as charts and table summaries using Statistical Package for Social Sciences (SPSS version 21).

3. Results

3.1 Socio-demographic characteristics

The study sought to identify perceptions of extension officials on factors that affect technology adoption by rural farmers. The socio demographic characteristics of the extension officials that were interviewed for the study are presented in Figures 1, 2 and 3. The results indicate that 75% (9) of the interviewed officials were female while 25% (3) were males. Female extension officials were on average older (49.8 years), employed and attached for longer periods (16.8 years) at the same area (work place) and spent slightly less years (15.3 years) in school compared to the male counterparts (15.7 years) since the majority of the respondents were Diploma holders as shown graph (Figure 1).

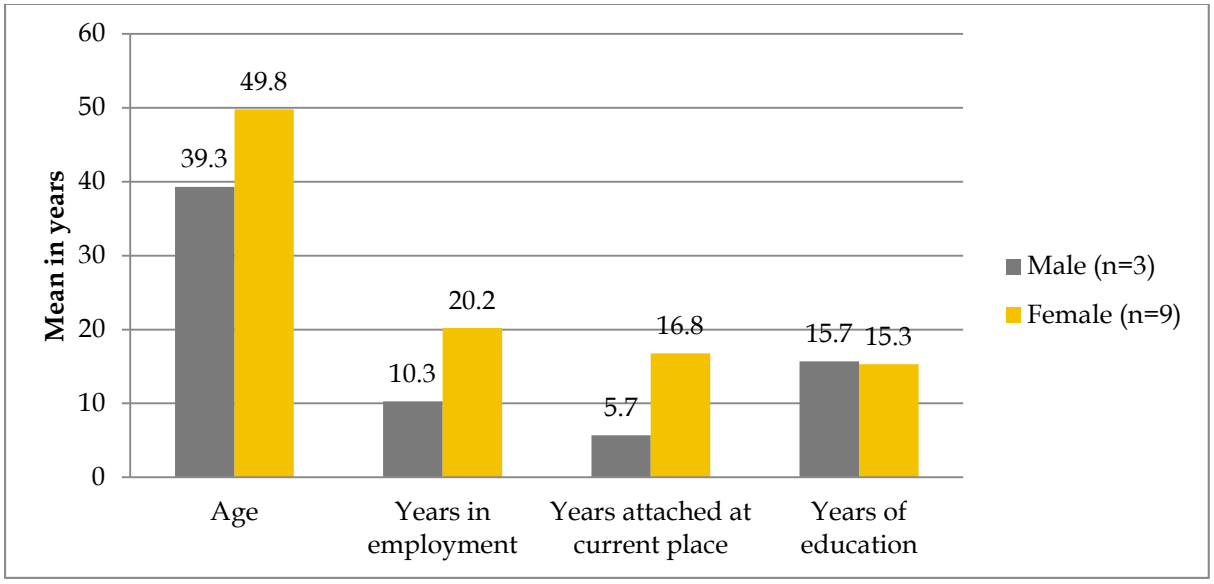

Figure 1: Means of age in years, years in employment, years attached at the current work place and years spent in school

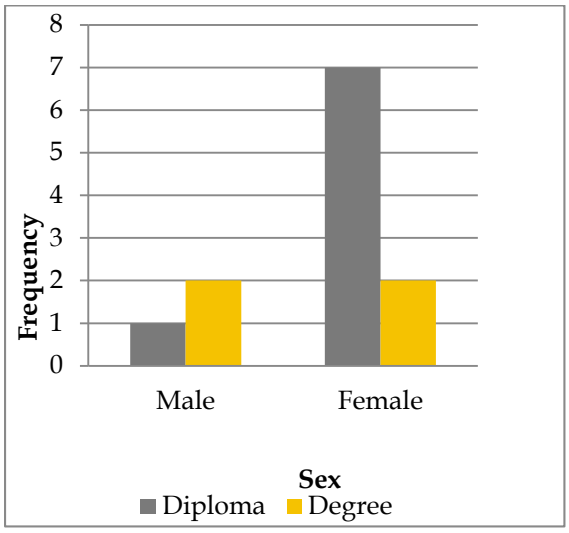

Figure 2: Highest level of education

Since most females were relatively older (Figure 1) this could explain the reason why most of them only had a diploma as it could be due to the many responsibilities that older women have especially in society, especially taking care of the family and the household and as a result furthering education will be competing with those roles. The study results further indicate that the majority of female officials only had a diploma qualification (7) compared to a degree or higher (2), as illustrated in Figure 2.

Moreover, Figure 3 shows that eight (8) of the nine (9) female extension officials were Senior Agricultural Technicians (SAT) with only one (1) who was an Agricultural Scientific Officer (ASO) while men were each employed as an Agricultural Scientific Officer, Chief Agricultural Technician (CAT) and Agricultural Technician (AT).

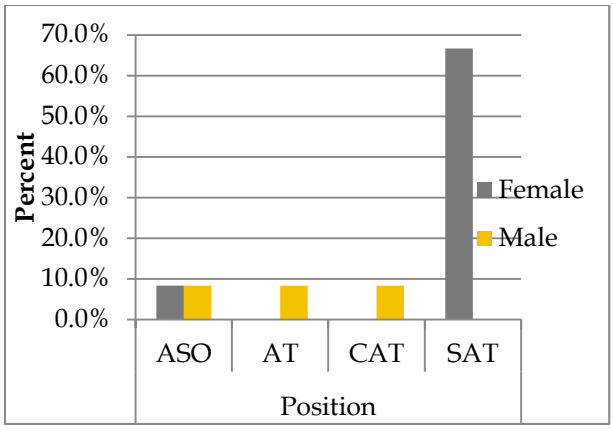

Figure 3: Extension officials' position and their gender

On average each extension official had population coverage of about 1400 households with female extension officials covering about 1077 while the male counterparts had 2044 households each. All the extension officials felt that agricultural modules that were taught to them during their tertiary studies were relevant to their work and 80% felt that the courses prepared them for the work they are doing while the remaining 20% felt that they needed further training.

3.2 Perceptions of extension officials on technology adoption

Extension officials engaged farmers to offer their services using various methods. The extension officials were asked to rank the various methods they used which were farmers seeking information from extension officers, extension officers visiting the farmers, group meetings as well as sharing information through media such as radio and newspapers. For the methods that they use, the extension officers were asked to rank the methods used most to the least. The results indicated that not all extension officers use the same methods as 67% ranked farmers themselves seeking information from extension officers as the most used, while 33% ranked going to the farmers as the most used, meetings and advertising or sharing information through various media such as radios and newspapers were not ranked as most used (Figure 4). The extension approach that is used is a combination of Participatory, Farming Systems Research and Extension (FSRE), and project.

In terms of the technology (agricultural technology and related innovations) the extension officials were asked to rank what they felt about those various technologies (drip irrigation, ripping, fertiliser application, use of improved seeds, mechanised planting and weeding, conservation agriculture practices among others) that they disseminate on a scale of 1 to 5, with 1 being strongly disagree and 5 strongly agree, they felt that the technology given to farmers was relevant (Table 1) and that the environment was relatively suitable for the technologies that they give.

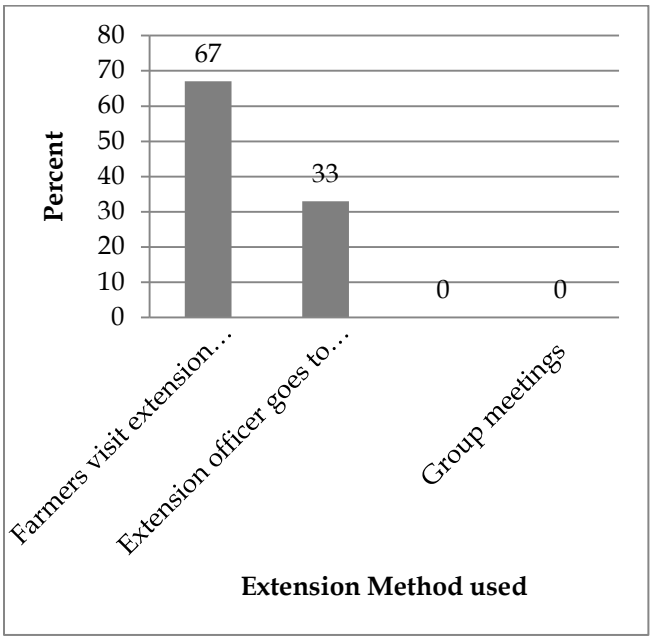

Figure 4: Most used extension services delivery method

The extension officials were asked to rank the factors that affect adoption of technologies by farmers. The results indicate that knowledge of an extension agent was ranked as highest with a mean rank of 4.8 from a scale of 1 to 5, 1 being strongly disagree and 5 strongly agree while complexity of technology and interest of farmers were ranked second and third respectively as factors affecting adoption (Table 2). Age of the farmer was deemed to have the least effect on adoption of technology.

Table 1: Perception of extension officials on the technology that they disseminate

Aspect	N	Mean Rank	Standard Deviation	Rank
Technologies given to farmers are relevant	10	4.6	0.5	1
Farmers do not have adequate resources to adopt technologies given	10	4	1.2	2
Farmers have negative attitude towards new technologies	10	3.9	0.9	3
Lack of adequate support from the government on the technology	10	3.6	1.1	4
Not sufficient time is given to training on new technologies	10	3.1	1.3	5
Farmers lack knowledge to adopting new technology	9	3	1.3	6
Farmers not motivated to adopt new technology	10	2.8	0.9	7
Farmers do not see advantages of new technology	10	2.7	1.3	8
Extension agents do not have sufficient information on technologies to give to farmers	10	2.6	1.3	9
The environment is not suitable for the technologies that are being brought	9	2.4	1.3	10

1= strongly disagree, 2 = disagree, 3 = nether agree or disagree, 4=Agree, 5=strongly agree

Table 2: Perception of extension officials on factors affecting adoption of technologies by farmers

Factor affecting adoption	N	Mean rank	Standard Deviation	Rank
Knowledge of extension agent	8	4.8	2.2	1
Complexity of technology	8	4.3	2.1	2
Interest of farmers	10	4	2	3
Education of farmers	10	3.8	2.9	4
Training given to farmer	8	3.8	2.1	4
Awareness of technology	9	3.6	1.4	6
Resources required	11	3.5	2.3	7
Age of farmer	10	3.4	2.6	8

1= strongly disagree, 2 = disagree, 3 = nether agree or disagree, 4=Agree, 5=strongly agree

The majority of the extension officials (80%) rated the adoption as moderate, with 53% somewhat satisfied with the adoption rate while 47% were satisfied with the adoption rate.

4. Discussions

It seems that the extension profession in Omusati Region is attractive to females as 9 (75%) out of the 12 of the interviewed extension officials were female. Most female extension officials had a diploma and they were mainly employed as extension technicians at different levels indicating that most do not continue with studies. As most of the interviewed extension officials were older, that could have been a contributing factor to being technicians. Female agents also tend to have slightly lower coverage area than their male counterparts. However it seems that the modules that they received prepared them for their work which concurs with findings of Graham, (2001) who found that the graduates of the extension program that were given at the University of Arkansas prepared them for work as perceived by their employers. Although age of the farmers was not perceived to be a major factor affecting adoption of technology by the extension agents, it is in contrast with findings of Nsabimana & Masabo (2005) which indicated that the older the farmers the less likely they are to adopt a new technology. The farmers' level of education was ranked highly by the extension agents in the sense that it is likely to affect adoption of technologies with the assertion that the less educated the farmers are, the less likely they are to adopt technologies. This agrees with the assertion that the higher the level of education the farmer has, the more likely he is to adopt an innovation as it is opined that as one gets more educated they become more receptive and open to change (Kabwe, Bigsby, & Cullen, 2009). This could mean that more non-adopters are likely to be found among the less educated while the majority of adopters will likely be

educated (Nmadu, Sallawu, & Ojomeso, 2015). Resources required to implement the technologies was perceived to rank lowly which seem to be in contrast with the literature. For example, Howley, Donoghue, & Heanue, (2012), assert that as income of a farmer increases the more likely the farmer is to adopt an innovation. In addition, characteristics of the technology such as its complexity was perceived to highly affect adoption as complicated technologies will take longer for farmers to learn. For example, the characteristics of the innovation may discourage adoption if the technology is too complex and difficult to try or test (Howley et al, 2012). Furthermore, awareness of technology that is being promoted was perceived to affect adoption of the technology although it was ranked lowly by the extension agents. For instance, it was argued that when farmers have limited access to innovation information, adoption is likely to be affected negatively (Feder, Richard, & Ziberman, 1985). The findings highlight that extension agents are not adequately supported by the government to sufficiently assist farmers with technology adoption although there are other farmer related factors that may also influence adoption. Thus to improve adoption of technologies by farmers in Omusati region some of the factors highlighted in the study findings need to be addressed as their importance cannot be overemphasised.

5. Conclusion

The study concludes that extension agents feel that the adoption of technologies in Omusati Region by the farmers is moderate and are somewhat satisfied with the adoption rate. Complexities of implementing the technology as well as the interest of farmers on technology given are crucial factors necessary for adoption of innovation. Extension officials perceive the technology to be relevant but farmer characteristics and government support are seen as affecting technology adoption by farmers. Support from government needs to be improved in order to enable extension agents to adequately support the farmers and deliver extension delivery services in addition to capacitating farmers in adoption of technologies.

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